REMARKS

Review and reconsideration of the Office Action of June 3, 2005, are respectfully requested in view of the above amendments and the following remarks.

Applicants have carefully reviewed the position of the Examiner and the prior art, and have revised the claims taking great care to avoid introduction of new matter.

Claim 15 is amended to incorporate the limitations found in claims 19, 20, 21, 31 and paragraph 10 of the specification. Claims 19, 20, 21, 31 have been cancelled.

Claim 22 is amended to depend from claim 15.

Claims 17, 23, and 24 are amended to independent form, incorporating limitations of new claim 15.

Claim 26 has been cancelled.

Claim 27 is amended to remove the reference to an optical signal. "A" is replaced with "The".

In Claims 18, 28, 29, 30, 32, 34 "A" is replaced with "The".

New claims 35 and 36 are based on paragraph [00011] of the specification. Claim 35 further defines the analysis step, and claim 36 defines a preferred intended use of the inventive process.

Present Invention

Electric motors such as fan motors are critical to the operation of many pieces of equipment. However, once the motors have been installed in a housing such as behind the dashboard of a motor vehicle, it is difficult to test the functionality of the electric motors.

The present invention makes it possible to easily check the functionality of such motors, e.g., immediately after installing, or as routine maintenance, without having to connect electrically in-line to the electric motor, without having to listen for the electric motor, and without having to optically inspect the electric motor for operation.

In the present invention was made based on the recognition that the electric motors, which may be installed in a vehicle and not directly easily accessible, **generate sufficiently strong alternating magnetic fields** to be tested using an antenna to receive with signal in the conventional prevalent frequency range of the rotation values of electric motors or the harmonics thereof. According to the invention, these signals are evaluated for functionality. This is a non-invasive, easy to carry out, simple, reliable, and information-rich method for testing the operability of electric motors the invention.

Office Action

Turning now to the Office Action in greater detail, our comments thereon are set forth below to facilitate your review.

Detailed Action

The Examiner advises that in the Preliminary Amendment filed 12/15/03, Claims 1-14 have been cancelled, and Claims 15-34 have been added; therefore, Claims 15-34 remain pending.

Claim Rejections - 35 USC § 103

Claims 15-16, 19-20, 23-25, 27-29, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aab (US 5,500,585) in view of Brown (US 4,506,218).

Applicants respectfully submit that this rejection is rendered moot in view of the amendment of claim 15 to recite that the a unit for analysis of the received signals includes a bandpass filter with a bandpass width corresponding at least partially to the conventional prevalent frequency range of the rotation values of electric motors or the harmonics thereof and an analog/digital converter subsequent to the antenna.

The differences between the present invention and the prior art are set forth in detail below.

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aab in view of Brown and in further view of Nienhuis (NPL: Physiology and Behavior).

Applicants respectfully traverse. The need to rely on numerous references is indicative of the unobviousness of the present invention.

Of crucial importance to the present inventive device is the useage of antennas to receive alternating magnetic fields generated by an electric motor, and to have in the testing device a unit for analysis of these alternating magnetic fields such that the signals provide indication of the operability of an electric motor. For this, one or more receiver coils are used according to claim 17 as antennas to receive alternating magnetic fields for the subsequent analysis of said signals.

A receiver coil acting as a receiver antenna reacts on a change of the magnetic field and does not determine the static, constant magnetic flux respective to the magnetic filed strength as it is typical for Hall-sensors. One or more receiver coils are used as antennas to receive alternating magnetic fields for the analysis of said signals.

Turning to Aab, this refernce teaches a device for detecting **the movement of a movable component**, with the device including a first position sensor which puts out a signal that is assigned to a first position range and a second position sensor which puts out a signal that is assigned to at least a second position range, wherein the two position ranges have an overlapping region, the respective signals output by the two sensors are fed to a signal processing arrangement which derives a direction signal (R) and a speed signal (G) from the two sensor output signals, the direction signal (R) and the speed signal (G) are assigned discrete values which are added together and are fed through a signal line to an evaluation arrangement.

Applicants respectfully submit that the present claims as amended clearly distinguish over the teaching of Aab.

Turning to Brown, this reference concerns the provision of a simple, reliable means for providing an indication of the operating condition of an alternating current machine. In accordance with the invention, the magnetic field strength or flux density established in an alternating current machine is sensed by a magnetic field responsive device, such as a Hall effect switch, and a decrease in that magnetic field strength below a level, indicating faulty operation of the machine, is sensed and converted to an alarm indication or control function. Since the magnetic field is alternating in direction, the Hall effect switch will produce one pulse for each cycle of applied alternating current, e.g., 60 Hz, providing the magnitude of the magnetic field exceeds the threshhold sensing level of the switch. Simple sensing circuitry, responsive to the constant 60 pulse per second repetition rate, provides an output signal which indicates the operating condition of the motor. Because it

is magnetic field rather than speed responsive, the sensing arrangement will also operate properly if the same motor is powered at a different frequency within its operating range, e.g. 50 Hz.

Applicants respectfully traverse.

The hall sensor of Brown measures strength of a signal. Thus, it must be placed in such proximity to an electric motor that the signal strength fluctuates between a value greater than that which would trigger a switch, and below value that would trigger a switch, such that the on/off fluctuation of the switch indicates operation of the motor. If the sensor is too far from the motor or too close to the motor, the switch will not be triggered.

The present invention represents a significant improvement over the system of Brown, and makes possible a field testing device which can be brought to the vicinity of an embedded motor, and can determine the operability of the motor without requiring the signal strength to be between a minimum and maximum value. By sensing the alternating fields, the device of the present invention can easily be used to sequentially detect operation of a number of electric motors, e.g., following installation in a motor vehicle. There is no need to provide one sensor specifically installed near the motor and dedicated to each electric motor, as in Brown.

Nienhuis and Siegel does not show a coil but exclusively a core (ferrite rod) which is suitable to determine the magnetic field strength utilizing the Hall-effect **at the location of the antenna coil core**. As shown in Fig.1 there are four antenna coil cores, thus rod-like Hall-sensors are arranged around the cat such that the position of each will be determined. Each of

these sensors is able to determine the value of the magnetic flux, hence the magnetic field at the location of the sensor and thereby the authors are able to infer the cats head position. Using the determined position, a computer can generate details regarding the movement velocity of the head.

Regarding the Examiner's rejection of claim 18 Applicants submit that the core argument regarding the prevention of signal noise or the reduction of noise through the use of multiple sensors to obtain a stronger signal is not valid.

Through the arrangement of multiple receiving coils differently aligned in space, which may be particularly orthogonal to each other, an amplification of the signal is more or less prevented if not impossible. Especially through utilization of orthogonally arranged coils and amplification and thereby reducing noise from interfering signals, which the Examiner mentions as the goal of the usage of multiple antennas, is prevented. From this it is evident that the argument of the Examiner is misleading. The arrangement of the receiving coils is preferably chosen orthogonal to each other, so that each coil is able to receive signals independently from the other coils. Through this arrangement of the three receiving coils according to the invention it is ensured that independent from the orientation of the test apparatus at least one of the antennas will receive a meaningful signal of the alternating magnetic fields and thereby a statement with regard to the functionality of the electrical motor is possible.

Claims 21-22, 26, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aab in view of Brown and in further view of Smith (US 5,523,701).

Applicants traverse for the reasons stated above and in view of the following additional remarks.

Specifically in reference to the rejection of Claim 27 the Examiner makes no reference to the acoustical signal. This would indicate that the acoustic signal within the claim would be allowable. We therefore have removed the optical and/or from the language of the claim.

Specifically in reference to the rejection of Claim 33, the Examiner simply indicates "see the above rejection in reference to Claim 15". However, we would argue that Claim 33 concerns the inventive solution to a difficult problem. Just because a suitable device for measuring magnetic fields might exist does not render obvious the process of using such a device to remotely, contactlessly measure the functionality of an electric motor.

The Examiner considers the prior art made of record and not relied upon pertinent to Applicants' disclosure.
Applicnats respectfully request consideration of claims 35 and 36.

Claim 35 is directed to a process as in claim 34, wherein said analyzing comprises

pre-determining the characteristics of the direct emission signature of a rotating functional electric motor to be tested,

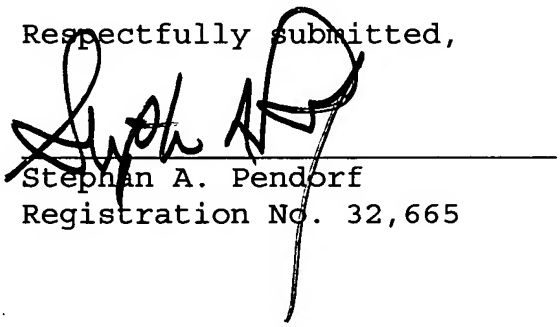
detecting the alternating electromagnetic fields in the vicinity of a motor to be tested, and

comparing said detected signal with said predetermined signal.

Claim 36 is directed to a process as in claim 34, wherein said electric motor is installed in a vehicle, wherein said vehicle has at least first and second electric motors, and wherein subsequent to analysis of said first electric motor said antenna is moved to the vicinity of said second electric motor and said process is repeated.

Applicants believe that all the claims are now allowable. Favorable consideration and early issuance of the Notice of Allowance are respectfully requested. Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.

Respectfully submitted,



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CERTIFICATE OF MAILING AND AUTHORIZATION TO CHARGE

I hereby certify that the foregoing AMENDMENT A for U.S. Application No. 10/736,469 filed December 15, 2003, was deposited in first class U.S. mail, with sufficient postage, addressed: Mail Stop Amendment, Commissioner of Patents and

Trademarks, P.O. Box 1450, Alexandria, VA 22313-1450, on **December 5, 2005.**

The Commissioner is hereby authorized to charge any additional fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account No. 16-0877.

Stephan A. Pendorf